

# Evolution of the Railway System of the European Union

A Regulatory Perspective

MAÚT 30 | 01.10.2024 | Budapest  
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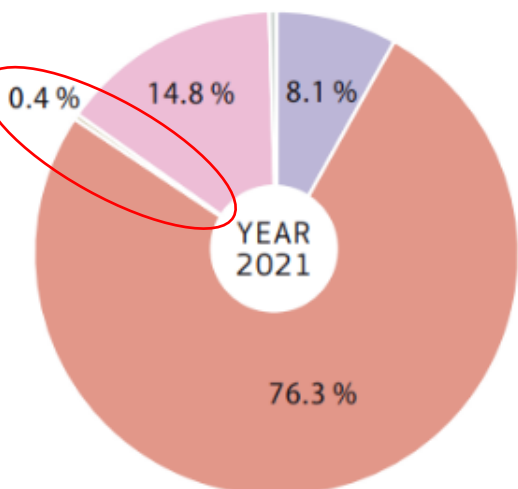
EUROPEAN  
UNION  
AGENCY  
FOR RAILWAYS



# Railways in Europe

## GHG-Emissions Transport (EU-27)

0.5 %



TOTAL CIVIL AVIATION

ROAD TRANSPORTATION

RAILWAYS (\*\*\*)

TOTAL NAVIGATION

OTHER

(\*\*\*) Excluding indirect emission  
; from electricity consumption.

### Ecological

Energy  
consumption/CO<sub>2</sub>  
5 – 10 x lower



### Safe

Passengers  
34 x more safe  
than on the road



### Expensive Infrastructure

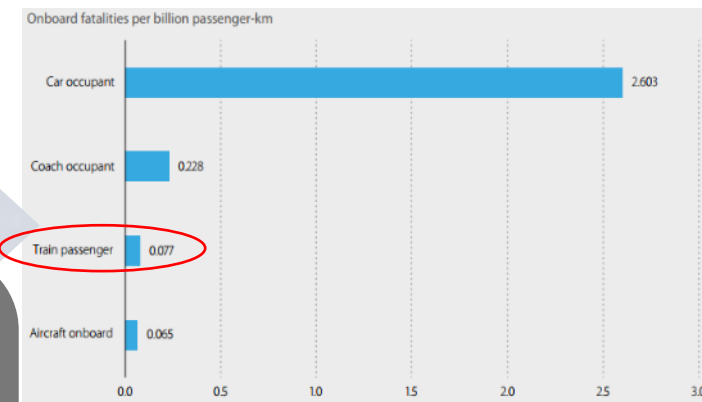
Invest and Maintenance



### Exposed to Disturbances

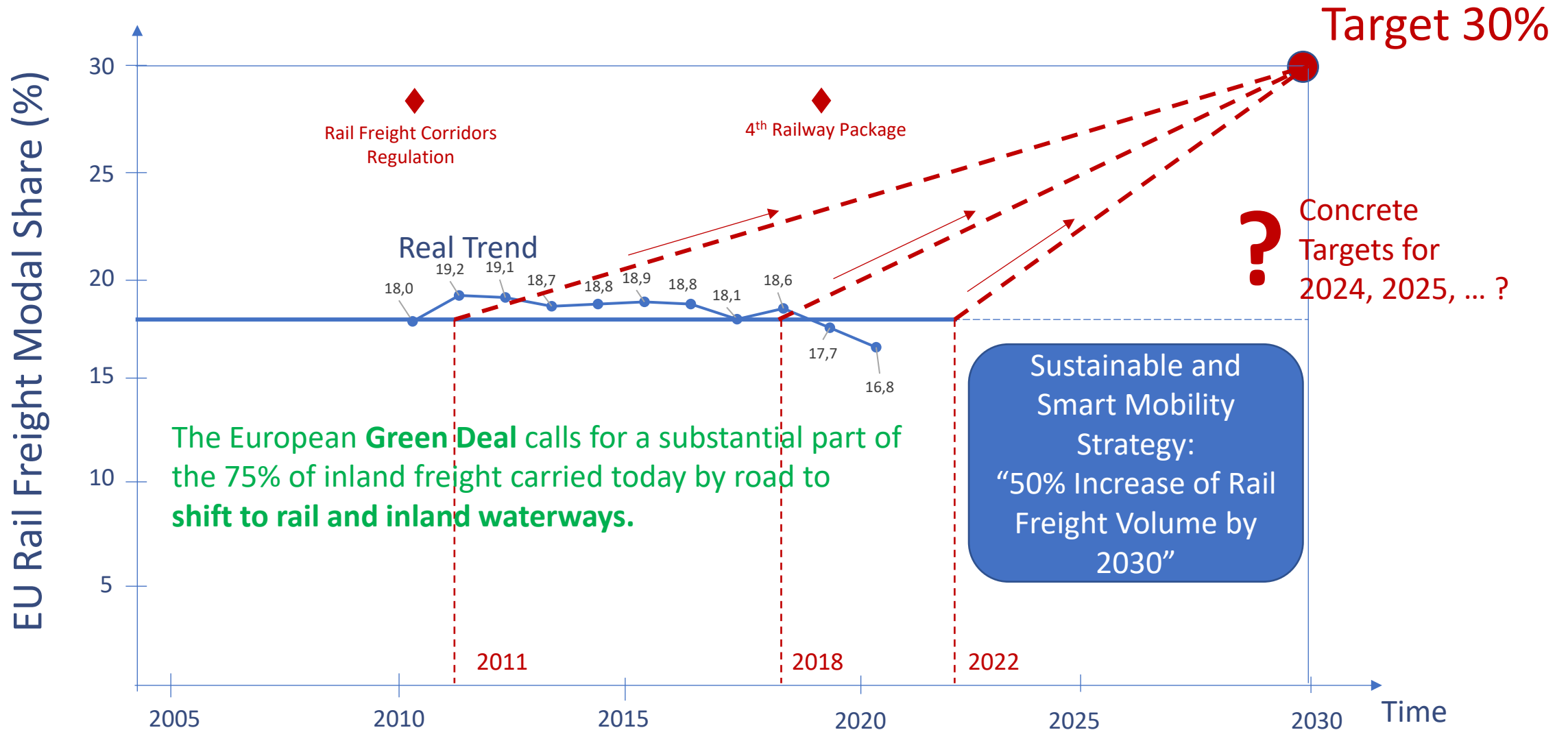
Tracks, Vehicles,  
Natural Disasters

## Safety of Transport Modes (EU-27, 2012 - 2021)

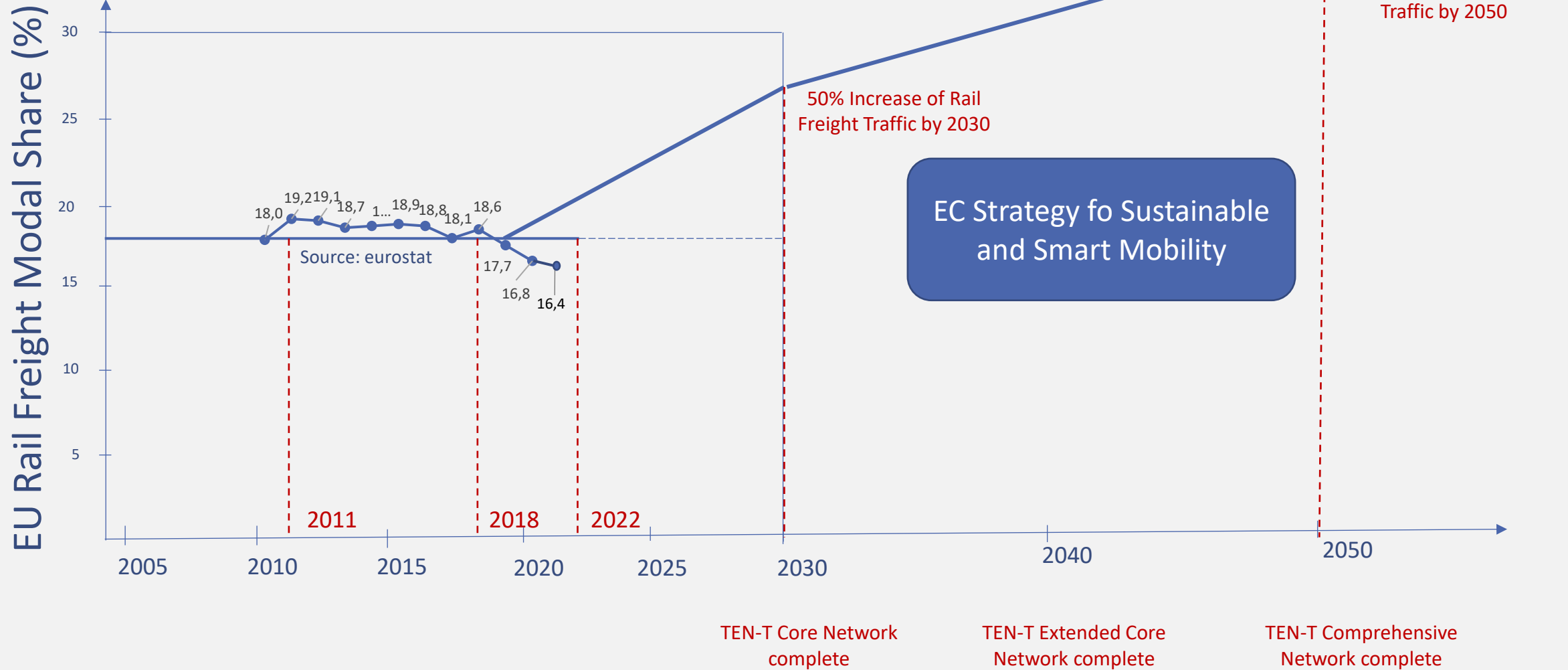


# Modal Shift Targets and Reality

## Rail Freight European Union

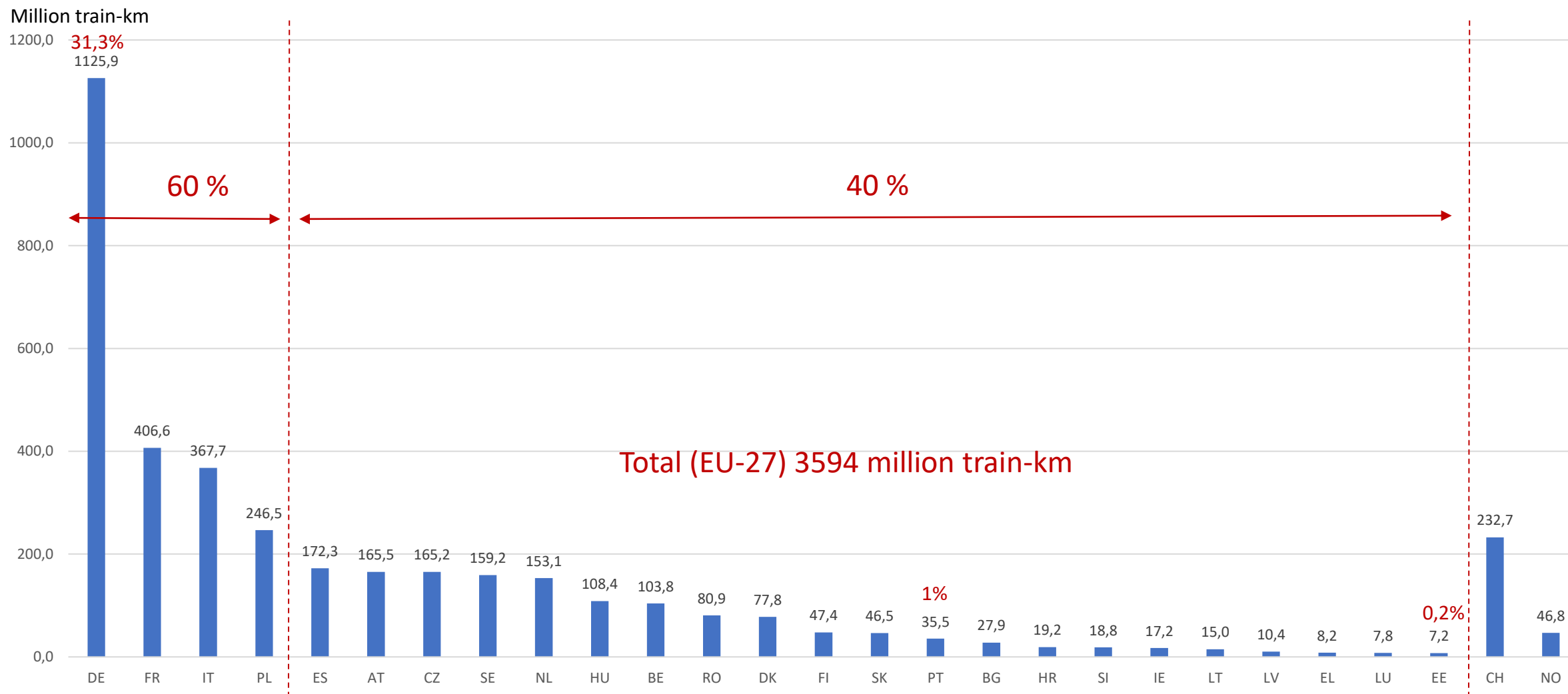


# Longer Term Outlook

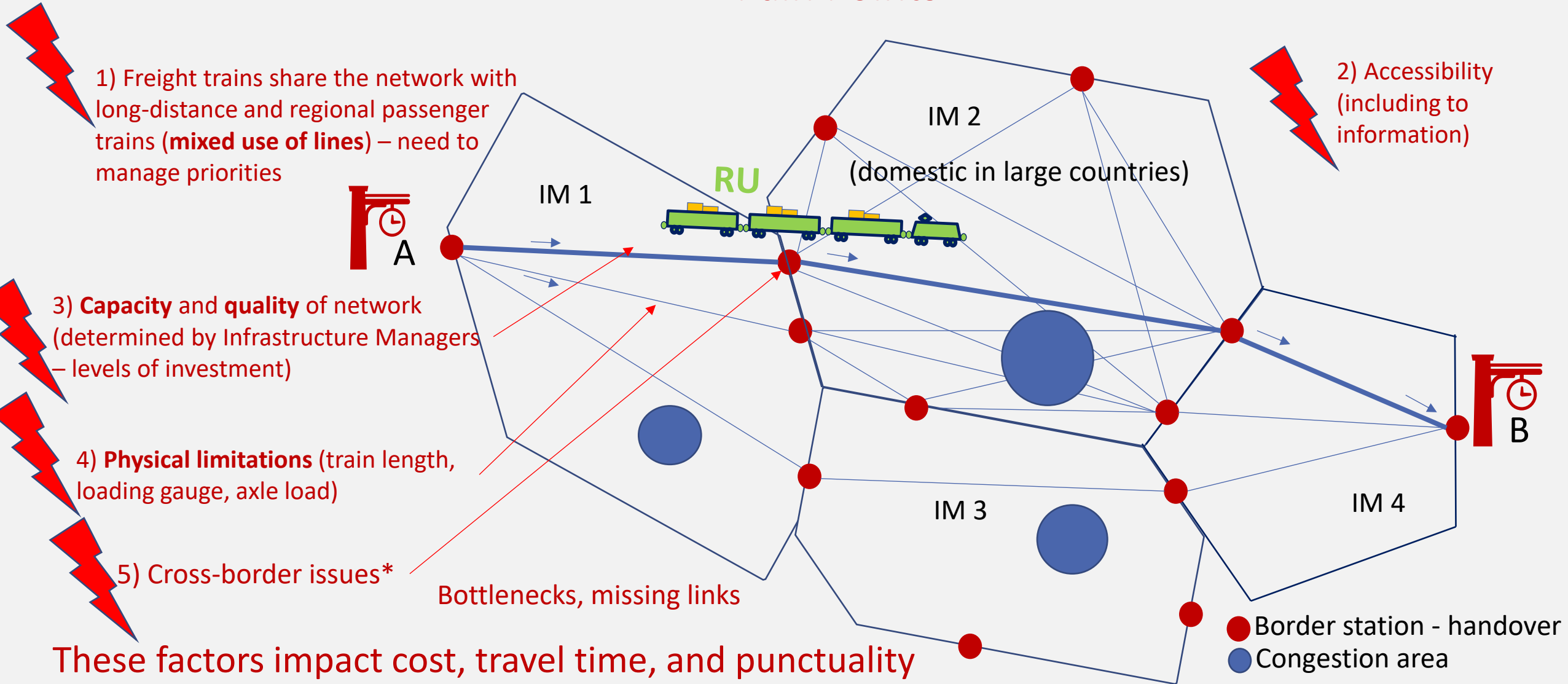


# Railway Traffic per Country

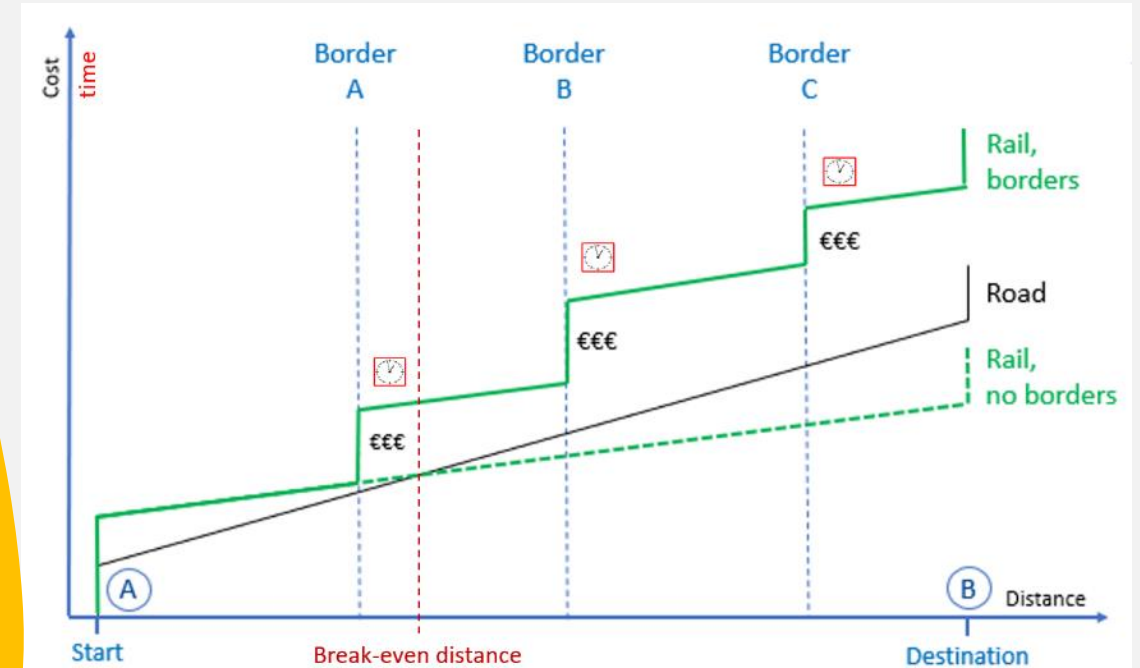
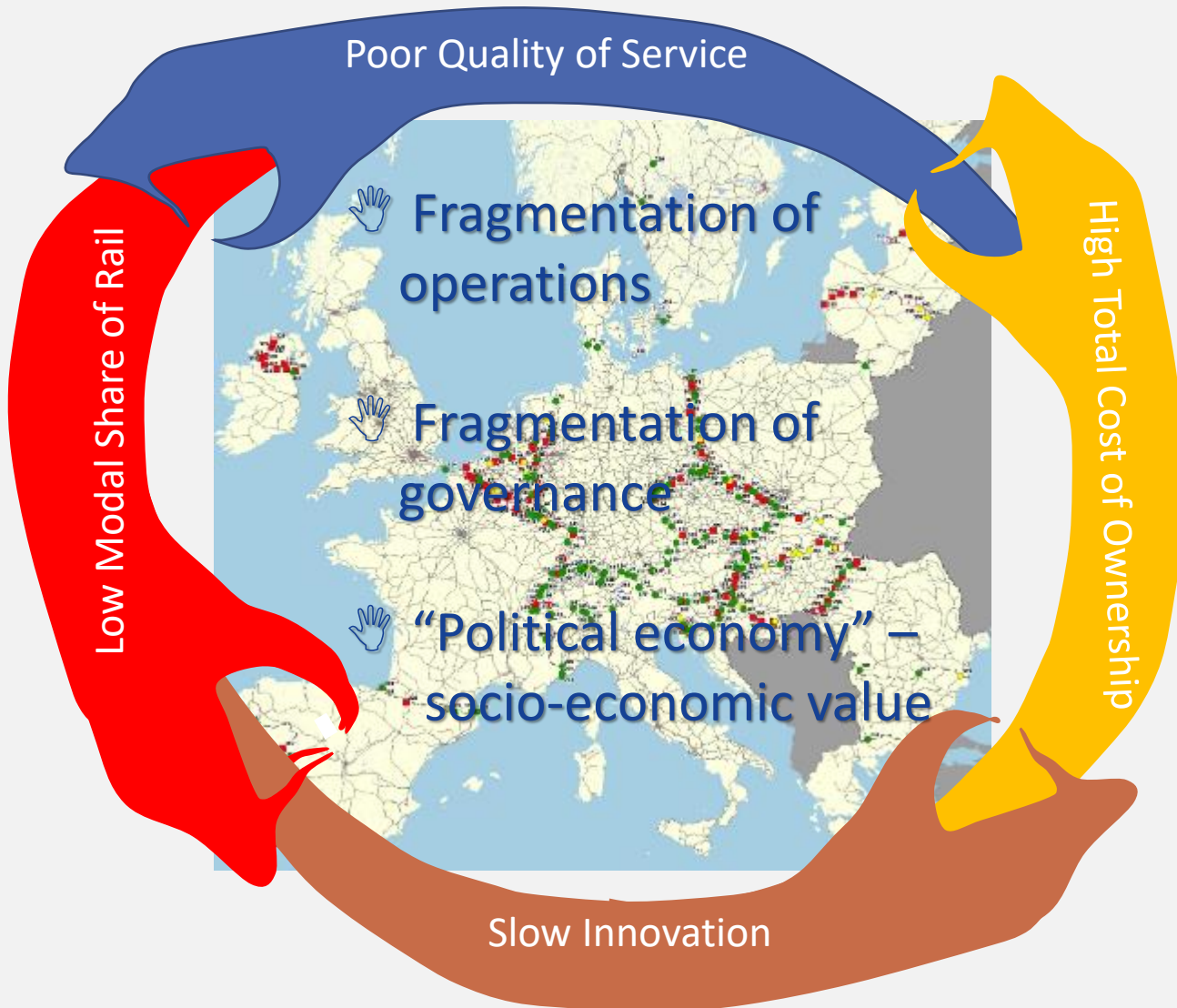
## Measured Train-km 2021



# International Freight Trains Suffer Pain Points



# Fragmentation vs. Competitiveness of Rail

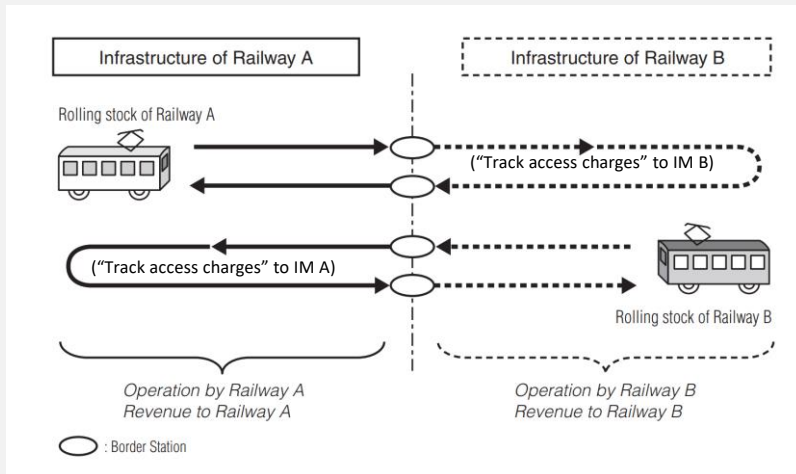


## Cross-border issues

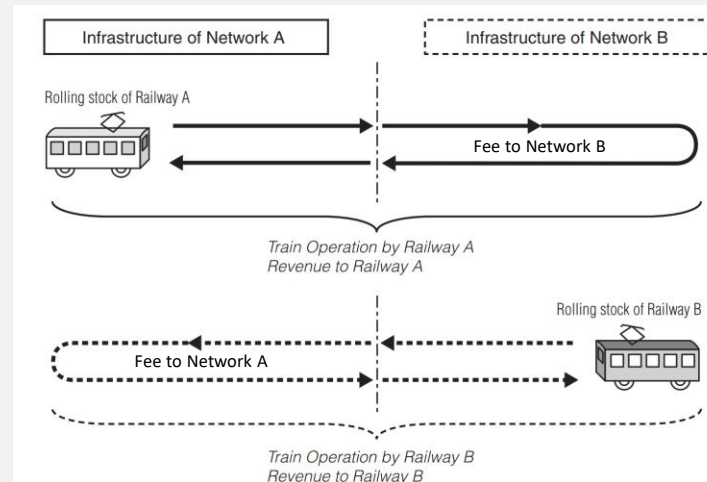
- ⚡ Language
- ⚡ National Rules
- ⚡ Timetable mismatch
- ⚡ Capacity mismatch
- ⚡ Priority mismatch
- ⚡ Divergent financial models
- ⚡ Change of train number
- ⚡ No real-time communication
- ⚡ Works not coordinated

# Cross-Border Rail Services

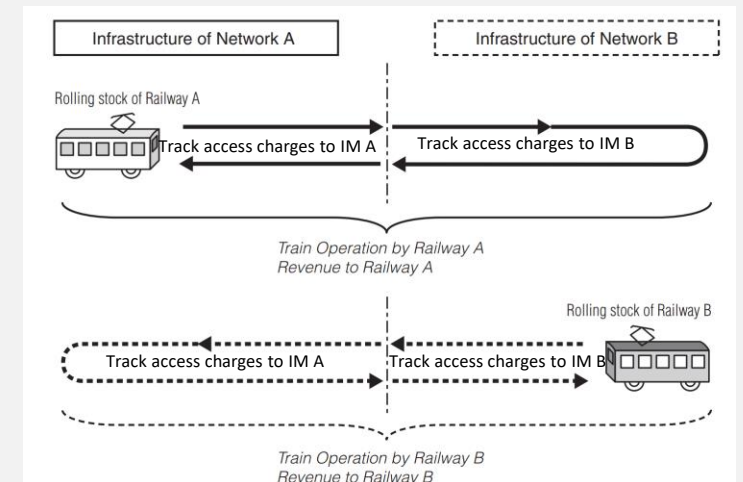
## Multiple contractual relationships



Handover



Péage  
(for certain trains on certain routes)

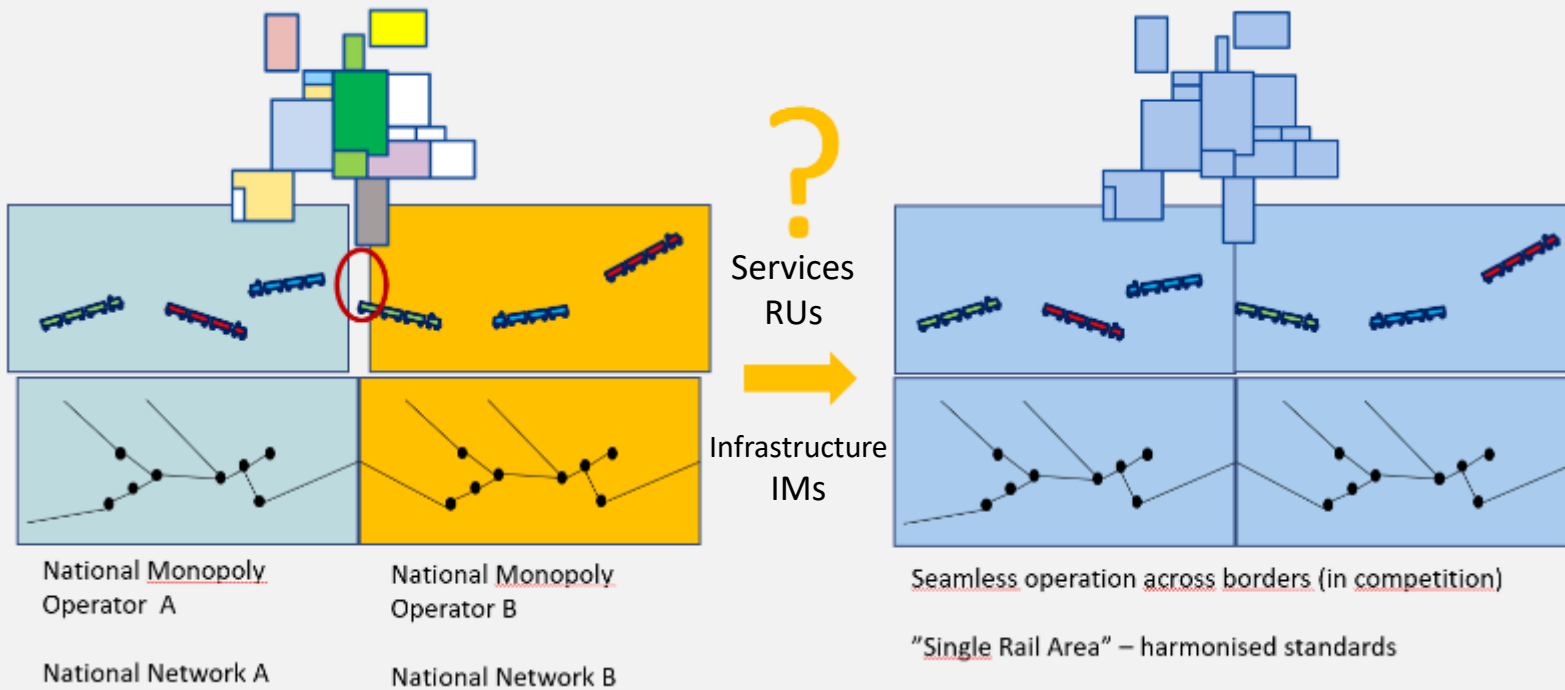


Open access  
(disintegration)

Separation of Service Provision from Infrastructure: electricity, energy, telecommunications, ...



# The Single European Railway Area (SERA)

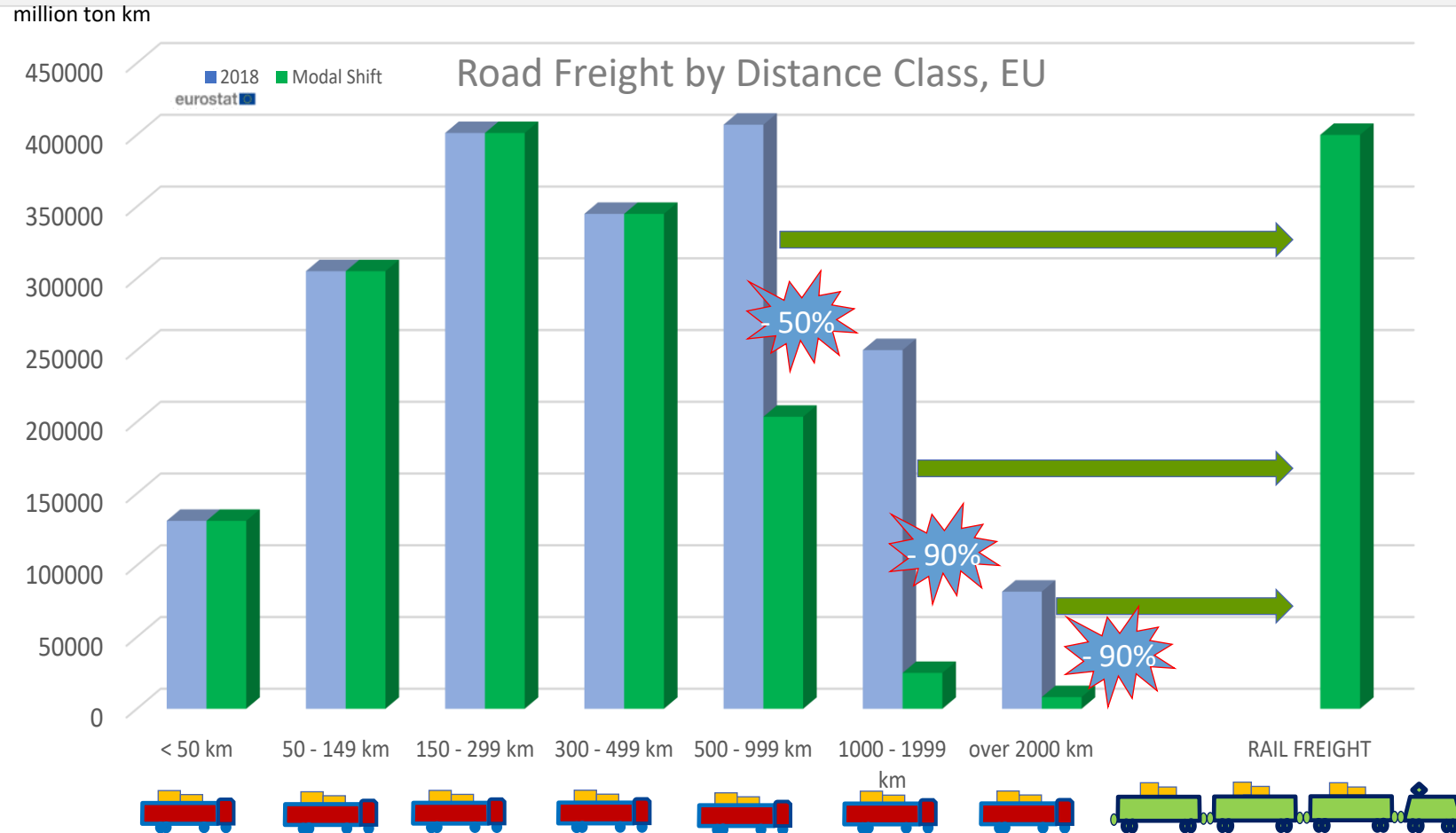


95%

"More than 95% of our traffic is domestic"

# Freight - the Potential

Modal shift potential from long-distance  
Road to Rail Freight (no Road Freight for > 700 km)



# 36 %

Rail Market Share –  
if long distance road  
freight is substituted  
by rail

Saving

# 40 million

tonnes CO<sub>2</sub>  
per year





# TEN-T Regulation

## Train Speed

Rail infrastructure (core network and extended core network): passenger trains at speeds 160 km/h or higher from 2040 onwards

## Train Length, Axle Load

Circulation of trains of 740 m length, axle weight 22.5 tons, nominal track gauge for new railway lines 1,435 mm

## Loading Gauge

Railway tracks adapted to at least a P400 standard

## ERTMS

Compulsory deployment of the European Rail Traffic Management System (ERTMS) with clear deadlines, progressively replacing the signaling and safety systems of each country

## Connections

Better and faster connections for passengers and freight with urban areas, ports, airports, and multimodal freight terminals

## Nominal Track Gauge

Migration to the European standard nominal track gauge with exemptions

## Airports

Airports with more than 12 million passengers to be connected to the trans-European railway network, including the high-speed railway network where possible

## Waiting Times

Operational parameters introduced in infrastructure management, e.g. average waiting time for a train at a border should not exceed 15 minutes, 90% of international trains to arrive at their destination with less than 30 min delay

## Terminals

Number and handling capacity of the intermodal terminals adapted to expected growth in traffic flows, as well as to 740 m long trains

# ERTMS – Rationale

Between 2030 and 2040, a significant part of the EU network should already be fitted with ERTMS



Operator

**ERTMS**

Infrastructure

Technical and operational interoperability (end-to-end)

Industrialised products

# Technical Specifications for Interoperability

The Agency prepares TSIs under a Mandate from the European Commission

A **TSI** is a common (harmonized) technical standard specifying the elements of essential requirements\* that need to be harmonized to achieve interoperability



- Safety, reliability and availability, health, environmental protection, technical compatibility, accessibility

TSIs relate to

- + structural subsystems (infrastructure, rolling stock, energy, CCS), or
- + functional subsystems (maintenance, traffic operation and management, telematics applications for passengers and freight services)

The TSI framework is supplemented by notified national technical rules (NNTRs)





# TSI Revision Package 2022/23

Topics covered (excerpt)

Development of **Combined Transport**

**Derailment detection** function

**Harmonisation** between **Rolling Stock and Fixed Installation** TSIs

Provisions for **EU-wide authorisation of vehicles**

Procedure for testing the **acoustic performance of composite brake blocks**

**ERTMS Game Changers**

- Requirements for the use of **ATO GoA1/A2**
- **Modular** on-board architecture
- Definition of **FRMCS**

Enhancing **information flows** for goods and passengers



Positive vote in  
RISC  
30 March 2023

# CCS TSI 2023/1695

## ATO

Introduction GoA 2



**Modularity**  
(Ethernet based)



Reduced envelope  
**SS-153**  
(ETCS B4R1 set of specifications)



## FRMCS v1

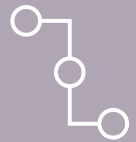
ETCS/ATO readiness for  
**FRMCS**



**Train Detection  
Compatibility**  
updated to V5.0  
(closing all related  
open points)

## Level 2

with/without train  
integrity  
(merge level 2 and 3)



ETCS readiness for  
**DAC**  
(Supervised Manoeuvres)

\*SS-153 published on Agency website  
(ready for CCS TSI amendment)



# ERA Support to More Harmonisation

- ERTMS System Authority
- ERTMS Trackside Approval
- Vehicle Authorisation (incl. CCS Subsystem)
  
- Future update(s) of CCS TSI (before 2030)
  - FRMCS B1R1
  - focus on cybersecurity aspects
  - focus on operational harmonisation and harmonisation of engineering rules for Trackside
  - ESC – RSC reduction
  - Modularity
  
- Future update(s) of CCS TSI (after 2030)
  - Satellite technology integration
  - ATO GOA3/4



# CONCLUSION



- Rail is by far the most **energy-efficient** mode of transport, and **very safe**
- Modal share of rail in Europe is low – **modal shift** needs **targeted investment** in a coherent, integrated European network, based on a **long-term strategy and commitment**
- Europeanisation – from national patchwork to a **European network** – standardization and interoperability
- ERA as System Authority and as Authorising Entity supports the **transformation to the Single European Railway Area**
- **Multimodal integration** (transport chains)
- **Digitalisation** - intelligent railway network
- Safety can be further improved by open sharing of safety and safety performance data, to further develop the **Safety Management System (SMS)** to control the **risks** of operational activities





# THANK YOU

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Moving Europe towards a sustainable and safe railway system without frontiers.

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